Research on Coalition Formation in Achieving Compatibility

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Abstract

There is one thing most people seem to know about standardization: It is slow. From a user's perspective, the competing technologies may present spurious differences that increase uncertainty, and create transaction costs. Established industry-wide standard development organizations (SDOs) may be slow to act, bureaucratic, and inflexible to changes in users' needs and new opportunities; consortia speed up the process of standardization. The paper aims at the consortia do indeed tend to correct these coordination failures. One thing is for sure: one part of standardization system requires a certain degree of revision and innovation.

Keywords

SDOs; Consortia; Hybrid Standardization

Introduction

Standards are accepted and necessary part of our industrial culture. Standardization is an essential enabling mechanism and a tool for many products. The standardization landscape information and communication technology industries are fragmented in many different standardization bodies, industry consortia, and alliances.

Currently, the main concerns voiced about standardization are costs and the slow going of the work [Sheriff, 2003]. The consortia movement is a major cause of competitive fragmentation of standardization. A better understanding of why companies have standardization strategies that give rise to fragmentation may show the possible advantages of fragmentation.

An end user can increase the utility of a product by connecting it to complementary products. Hardware and software are examples of this. Connecting different devices may also benefit users by enabling them to communicate with each other by voice or data communication.

The most cent rated coalition structure is the *grand coalition*: a coalition that includes all participants in the standardizing process. In the case of a standard that affects an industry, this will be an industry-wide coalition. It may take the form of an official standards development organization (SDO).

Established industry-wide standard development organizations (SDOs) may be slow to act, bureaucratic, and inflexible to changes in users' needs and new opportunities; consortia speed up the process of standardization. One way to speed up decision making for members to split up is to create faster consortia [Warner, 2003]. Participants with different or opposite interests may, for instance, be excluded from the coalition.

A grand coalition has a better chance of ensuring compatibility between the technologies than competing coalitions. A grand coalition, however, may also take more time to arrive at a decision than competing coalitions. The greater speed does come at the possible risk of selecting incompatible technologies, which generates an inter-coalition coordination failure.

This paper subjects the common view to a critical and theoretical analysis. The next section presents some examples of grand coalitions and competing coalitions. The subsequent section of this paper asks: Is there support from the literature the grand coalitions are reduced in their speed of decision making by internal antagonism? And do competing coalitions arrive at standards quicker than a grand coalition would, at a cost of less compatibility? Maybe, though, there is scope for faster and more efficient work: Changing a few working principles and improving working conditions may help a lot.

Grand Coalitions vs. Competing Coalitions

The DVD Forum is an example of a grand coalition. It is an industry-wide consortium that developments and promotes the DVD format as a standard. There are currently three technologies for DVD-rewritable: DVD-RAM, DVD+RW, and DVD-RW. Each of these has a coalition of supporters. For example, Sony, Ricoh, Hewlett-Packard, Philips, Mitsubishi, and Yamaha support DVD+RW. Samsung, Toshiba, LG, Hitachi are DVD-RAM alliance.

The DVD Forum did not select a priory a standard for DVD-rewritable. It does note on its homepage: "Please note that the '+RW' format, also known as 'DVD+RW' was neither developed nor approved by DVD Forum. The approved recordable formats are DVD-R, DVD-RW, and DVD-RAM (DVD Forum, http://www.dvd forum.org/forum.html).

The DVD example shows that a grand coalition can exist that endorses a unified standard, notably the DVD standard. It also shows cases with competing coalitions. The grand coalition is, with more than 200 members, very large indeed. The political nature of their cooperation can hamper thaw activities of the Forum. The next section explores a trade-off that may explain the push and pull between, on the one hand, consolidation into a grand coalition and, on the other hand, fragmentation into competing coalitions.

Trade-Off between Timing and Compatibility

Is a coalition structure that is geared to achieving compatibility ill-suited to select a standard quickly? The proposition we wish to explore is that the higher the level of centralization of a coalition structure, the higher the chance that it generates compatibility at the industry level and the longer standardization tends to take.

By implication, the larger a coalition is, the slower its decision making tends to be. In a setting with a given set of firms, this implies that a grand coalition will decide slower than competing coalitions would. Forming a coalition is a time-consuming process [Tan, 2006]. The more people are involved, the more time it takes to communicate with them. In the Internet tradition, for example, participants in a standardization process will often need to define concepts first, using a document type called a Request for Comments (RFC). An example is RFC 2119 of the Internet Engineering Task Force(IFTF), which defines among other things the meaning of concepts such as must, must not, shall, etc.

Organizations may invest in influencing activities to influence the coalition's decision making [van Wegberg, 2004]. Rules and procedures in standardization coalitions may suppress political behavior of individual participants. As a result, these firms may abandon the coalition and set up competing coalitions. A grand coalition may want to prevent defection by being very responsive to the interests of its members [Sheriff, 2003]. Hence, a grand coalition faces some tension between speeding up decision making and ensuring compatibility of new technologies.

For example, the IEEE has developed several standards for wireless data communications. Some of these technologies use the same unlicensed frequency band. As a consequence, wireless systems can interfere. Interference can diminish the quality of the signal. The IEEE developed standards for Wireless Local Area Networks and Wireless Personal Area Networks that reduce the disadvantages of interference.

The effort in a grand coalition to create compatibility is another reason why the process may take more time than competing coalitions. The different options reflect different interests and views of the parties combined in the SDO or coalition. A disadvantage is that in the implementation phase, differences come to light in the technologies used by the standard's adopters, due to their different choices of which options to activate.

Grand coalition knows they need to speed up decision making [Funk and Menthe, 2001]. One of the solutions is to produce incomplete standardization by means of meta-standard. A *meta-standard* establishes some conditions and aspects of a standard, without specifying the standard itself in full detail. The advantage of having a meta-standard in an early stage is that it preempts companies that might otherwise commit to incompatible technologies. A disadvantage of setting a meta-standard is that private companies adopt technologies that are only partially standardized.

There are thus various reasons why a grand coalition may not be able to guarantee compatibility. A meta-standard can speed up standardization, at a cost of leading to incompatible technologies in use. This lead to *hybrid standardization*: a standardization process where firms pursue standardization by two simultaneous paths, using both the market mechanism and negation in a coalition [Tan, Yoo and Yi, 2007].

Hybrid standardization increases the bargainingpower of coalition members that have a strong position in

their product markets. The presence of competing specifications in technologies reduces the level of compatibility. To conclude the discussion: it is likely, but by no means certain, that a grand coalition takes more time to conclude a standard than smaller competing coalitions would. It is, moreover, not self-evident that a grand coalition ensures a higher degree of compatibility, than competing coalitions would. Only when a grand coalition compensates for a longer duration of decision making, by increasing the expected degree of compatibility, do firms face the trade-off between speed of decision making and compatibility.

The Context of Consortia

Complaints about slowness of standardization may be less relevant for technologies with long lead times for development and deployment, such as for infrastructure projects.

The consortia movement has led to fragmentation of standardization. It has compromised the ability of SDOs to act as a grand coalition. It is suggested that if the preference that firms have a high level of compatibility would decrease, and their preference of speedy standardization would increase, they would want to switch from a grand coalition to competing coalition.

In reality, many consortia based their work on existing formal standards. For example, the hypertext markup language (HTML) and extensible markup language (XML) descend from the standardized general markup language (SGML) that ISO defined in 1986 on a contribution from IBM.

An important step in exploring firms' preferences for coalition structures is the value they attach to compatibility. An open industry-wide standard can be a platform for new services. There are direct network externalities if new services enable users to communicate with each other. On the demand side of the market, compatibility may not be very important. If users tend to communicate in small communities, the sheer size of the network of users may not increase their benefit. Even if there is no standard, service providers may realize network externalities for their end users. Converters link the users of otherwise incompatible technologies.

On the supply side of the market too, there may be insufficient preferences for compatibility. Innovators may benefit if their innovation is accepted as a standard. They are concerned about the appropriability of revenue streams. If a standard increases the value of the intellectual property right on a technology, the firm may be more interested in supporting one particular technology than in having an industry-wide standard parse.

Shy [1996] shows among others than if new technology is backward-compatible with the old technology, users are more likely to switch to the new technology. The lifetime of a standard thus depends on the willingness of users to wait for better technology to appear.

Technologies have a lifecycle; the more time in this cycle aborted in the standardization process, the less time remains for using it in marketable products. Furthermore, from a user's viewpoint, it is more likely that the quality of the final product or service counts more than time to define a formal standard.

Suggestions for Solution

Figure 1 summarizes the relationships discussed so far. A shift in the objectives of firms may have occurred, away from stressing network externalities, and toward greater emphasis on pre-emptive moves, first-move advantages, and intellectual property rights. This shift itself would explain the fragmentation created by the consortia movement.

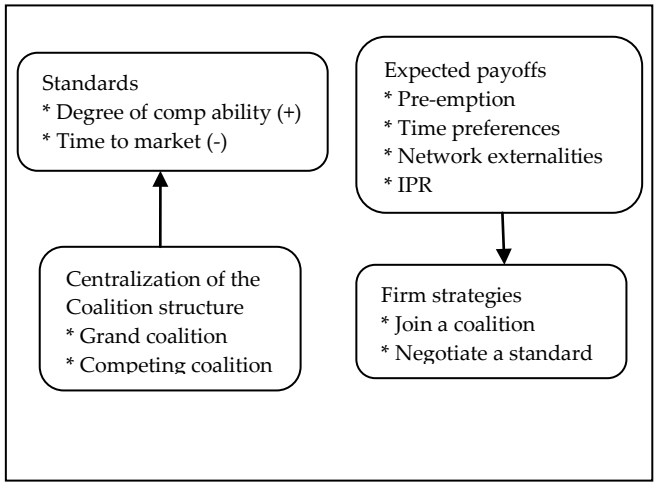

FIG. 1 CHOICE OF COALITION STRYCTURE IN THE TRADE-OFF BETWEEN SPEED AND COMPATIBILITY

The problem for a grand coalition is that its main value added is to enhance compatibility between the technologies that adopters will be using. The more it works toward achieving this goal, the more it will be perceived as a slow mover. These may increase the speed of decision making, but they do jeopardize the compatibility and interoperability of technologies used.

Faced with the trade-offs between speed of decision making compatibility, a grand coalition may try to

have its cake and eat it too. Some official SDOs have established workshops for different standards. The European SDO CEN/ISSS uses workshops to attract new members and develop consensus quickly. CEN is organized in a number of technical committees (TCs), each of which is dedicated to specific subjects: for example, TC48 is dedicated to domestic gas-fired water heaters. There are about 220 committees, of which about 10 are more or less concerned with IT matters.

Another way to involve private companies is by creating workgroups and giving this fast-track access to standards approval. These workgroup may become substitutes for private consortia. These may be some fragmentation left, but this will take the form of multiple workgroups or workshops within the common framework of an SDO or grand coalition.

The problem lies in a different field is fragmentation, and an associated loss of coordination at the level of the industry. They may overcome this problem by consolidation.

The DVD example showed how two competing coalitions merged into the DVD Consortium. The resulting coordination may fall short of creating compatibility. The DVD Forum, for instance, hosts two workgroups that work on incompatible specifications for DVD-rewritable ---the DVD-RAM and DVD-RW specifications. These solutions suggest that some convergence occurs between SDOs and consortia. Some SDOs become more consortium-like, by providing fast-track approval procedures, and opening workgroups or workshops to private companies.

However, differences in priorities and objectives are likely to persist between private consortia and official SDOs. Where fragmentation is unavoidable, coordination can be improved by creating liaisons between SDOs and consortia. For example, several SDOs have established MoUs (Memorandums of Understanding) about their relationships with one another and with private consortia. These new forms of coordination's may reduce the unintentional levels of incompatibility that may result from fragmentation; also, they may increase the time and effort needed to develop new standards. Therefore, they represent new forms of coalitional standardization processes.

Conclusions

The urgency of a standard varies on whether the innovation is incremental, architectural, or radical, or a platform innovation. It is estimated that half of the economic benefit of a new technology comes from process improvements after the technology has been commercially established.

Aiming at the trade-off between speed and compatibility, this paper proposes that having an industry-wide standardization coalition may slow down standardization, compared to cases where smaller coalitions of firms compete with each other.

Competing technology sponsors hold the grand coalition to ransom, in order to get their preferred technologies selected as standard. Competing coalitions have a greater incentive to speed up their decision making. The presence of competing coalitions may, however, lead to incompatible technologies being adopted in the marketplace.

Technology adopters may have a greater preference for compatibility and interoperability. This may exacerbate a conflict of interest between technology sponsors, on the one hand, and technology adopters on the other hand.

Their fear for incompatibility may hold back standardization in competing committees. Technology adopters give in to politicking themselves, in order to avoid an unwanted level of incompatibility. As a result, in certain situations a grand coalition can decide quicker than competing committees. It satisfies the greater preference that technology adopters tend to have for compatibility.

The result sheds doubt on the common view that industry-wide standardization coalitions are slow. In choosing a coalition structure, firms balance two types of coordination failure---the failure to select an industry-wide standard(when competing committees support competing technologies) and the failure to decide in timely manner(when negotiations in grand coalition lead to stalemate or when competing committees hold back, fearing incompatibility).

The purpose of this paper is to offer an objectiveevaluation of the trade-off between speed and compatibility. According to the common view, the need to reach an agreement between competitors within a grand coalition leads to lengthy negotiations. If sponsors of rival technologies set up their own coalitions, this can speed up standardization. Competition between standardization coalitions does, however, squander some benefits of having a standard.

The new insight of this paper is that a fear for resulting

incompatibility affects the timing of decision making in negative way. This does slow down the standardization process with competing coalitions. While standardization can take place anytime, successful standards meet the expected needs of technology users. By matching the timing of standards to the intrinsic capabilities of the technology as well as the market situation, it is possible to analyze the adequate speed of standardization. Technology adopters may slow down the coalition they participate in, in order to keep track of what a rival coalition is up to.

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